THE

Saturday Magazine.

Nº 335. SEPTEMBER 23RD, 1837. PRICE ONE PENNY.

THE RHINE. No. III.

BOPPART.

THE TOWN OF BOPPART.

The Vineyards of the Rhine.

Boppart is a small town upon the left bank of the Rhine. It is generally identified by antiquaries with the *Baudobrica* of the Romans, one of the five citadels built by Drusus, in which there was stationed a præfect of the soldiers called balistarii. The kings of Franconia afterwards built a palace upon this spot, the ruins are still to be seen; and there is another memorial of the ancient royal residence, in the name of Königsback, or King's Rivulet, which is given to a small stream, which falls into the Rhine close by. It was afterwards created an imperial city, and in 1312 was transferred by the Emperor, Henry the Seventh, to his brother, the Archbishop and Elector of Treves, who annexed it to his dominions. Once it attempted to regain its liberty, but the attempt was unsuccessful, and the town remained quietly in subjection to its electoral master until the changes occasioned by the French Revolution. It belongs at present to Prussia, and is included in the province of the Lower Rhine.

Boppart is a very curious old town, built on the ruins of ancient forts and palaces, erected in the days of the Romans and the Franks. Some old convents have been converted into more useful purposes than their original intent; the principal one, that of Marienberg, situated above the town, has been converted into an extensive cotton-manufactory. The church is apparently not less ancient, or curious in its Gothic structure and its octagonal spires, than the convents.

The houses appear to be built mostly of wooden beams, arranged in various directions, and the spaces between them filled up with lath and clay. The streets are narrow, and as the second and upper stories project beyond the ground-story, "the opposite neighbours might almost shake hands out of their gable ends." The wood-work is generally painted black, and sometimes carved and twisted into a variety of shapes. It is almost unnecessary to add, that the streets are ill-paved, and miserably dirty; but this is not peculiar to Boppart, being the common characteristic of every Catholic town along the banks of the Rhine. Indeed it may be mentioned as a general observation, that although the road which skirts the left bank of the Rhine, from Coblentz to Bingen, is one of the most level and beautiful perhaps in all Europe, the moment it comes within the verge of a town or village, it seems to be infected with the prevailing malady, and ceases to deserve any commendation.

The road here mentioned was executed by the French army while it held possession of the country; but it appears, from the accounts of early travellers, that it was always a good mountain-road, though liable, in common with all roads so situated, to be cut up by the torrents. The French engineers, by blasting the basaltic rocks, levelling down the inequalities, and forming arched sewers for the swollen torrents to pass under the road instead of sweeping across it, have now made it a most perfect, level, Macadamized road, on which neither hole nor rut is to be seen. The materials of which it is formed are admirably adapted for the purpose; heaps of the broken prepared stones are kept by the road-side, ready to be laid on when required. The road generally winds close along the edges of the precipitous and naked basaltic mountains, but sometimes it approaches the very verge of the Rhine, and here the traveller is protected by a fence of posts and rails. This road is much frequented by travellers, who ascend the river by land, and descend by water,—the course which it is best for those to follow who visit this delightful country,—one-half of the route supplies the defects of the other half. In ascending by the road, the traveller has the opportunity of visiting the towns upon the banks, and taking his own time to examine whatever may interest him on the way; but as he is conveyed under high and overhanging mountains, he is unable to take in at one view the whole of the scenery around him. On the other hand, in descending by water, every object on both sides is brought at once before him, as he glides down the middle of the stream, at the rate of perhaps ten miles an hour; thence he views, in quick succession, the ever-varying features of the romantic and picturesque mountains, at one time appearing with naked and pinnacled summits under every fantastic shape, at another clothed with orchards, vineyards, and forests, and every now and then surmounted by an ancient castle or convent in ruins. This great variety of objects keeps the eye and the imagination continually on the stretch, while the margins of the smooth and silvery Rhine, forming a chain of lakes, exhibit to the view cities, towns, and villages, interspersed with the varied scenery of corn-fields, groves, and orchards, and render it impossible to quit the deck for a moment.

The appearance of Boppart corresponds with its antiquity; it has a dark and sombre character, somewhat relieved, however, by the verdant foliage of the trees in the vicinity, backed by the lofty mountains, rising one above the other, each forming a spacious platform, covered with woods or cultivated fields. These mountainous terraces are formed for the rearing of the vine; so that "you may look up from your boat," to use the words of Dr. Cogan, "as you are swimming with the current, and contemplate the husbandman pruning the vines at an immense height above you; you will calm your fears for his safety by discovering walls of rugged stones, arranged at different stages of the steep ascent, to stop the falling soil, that it may be converted into a kindly mould."

Throughout the whole of the long ravine which extends from Boppart to Bingen, the Rhine is so closely hemmed in by steep mountains, as to admit of no other produce than what the vineyards afford. In fact, the principal part of the food of the people inhabiting this ravine, must be brought from a distance, as, from the scarcity of land, wine and fruit are the only articles capable of cultivation. A modern tourist expresses surprise, how the vineyards in some parts of this district can possibly pay the labour of cultivation.

There is scarcely a patch of half an acre in any one continued space, mostly not half a rood. Every little sheltered spot, however small, that possesses the least soil,—every little crevice between the naked rocks,—is choked up with vines; in many places the vine is planted in a basket with adventitious soil, and sunk in the rocky fragments by the side of the hill. The care and the labour bestowed, though not toilsome, is constant, and the distance is frequently several miles which the poor cultivator has to go from his habitation to his vineyard,—we should rather say *hers*, for they appear to be chiefly women, who bear but very little resemblance to those fair and sylph-like damsels with which painters are in the habit of peopling their vineyards, when assembled to gather the purple grape. A jacket and petticoat, a dirty handkerchief tied round the head, the legs and feet naked, the features dark, dull, and unmeaning, furnish the true picture of a female labourer of a Rhenish vineyard; and this was so generally the prevailing feature of the picture in all places where the chief produce was wine, that we may almost with certainty come to the conclusion, that the culture of the vine is an indication of the poverty of those who perform the manual labour, however profitable it may be to the large proprietor.

The mode of cultivating the vine on terraces, formed upon the sides of the mountains bordering the Rhine, is carried to great perfection towards the upper extremity of the long narrow ravine extending from Boppart to Bingen. Between Asmanshausen and Ehrenfels, the steep sides of the mountains, to the height of at least a thousand feet, are covered with vines, growing entirely on terraces, one rising above another to the very summit, the earth on which is kept up by well-built stone walls, of from five to eight feet in height; yet many of these terraces are not twice the breadth of the height of the walls that support them. Nearly opposite Bingen, and about Ehrenfels, may be counted no less than twenty-two of these terraces, rising one above the other.

The vineyards of the Rhine, as it has been often observed, are like the vine-clad hills of France,—prettier things to read of than to see. Unfortunately for the lovers of the picturesque, the maxim is well established in this branch of agriculture, that the fruit of high vines never ripens so well as the fruit of vines which are trained low, and that the quality of the wine is almost always in the inverse ratio of the exuberance of the growth. In those districts where the culture of the plant is best understood, it is seldom allowed to rise higher than two or three feet; it thus receives the benefit of the reflected as well as the direct solar rays, and of the warm exhalations that ascend from the earth. If appearance alone were studied, as Dr. Henderson remarks, the bald and stunted vines of Burgundy and Champagne must yield to those of sunny Italy, where they are allowed to send forth their foliage full and

unbroken, and where their branches, entwining round each other, and occasionally forming festoons from tree to tree, "as if the hand of taste itself had directed their arrangement," (to use the words of another writer,) contribute to variegate and adorn the scene. But where is the wine yielded by these beautiful plants that can, for an instant, be compared with the produce of their dwarfish rivals, on what the Italians are pleased to call "the barbarian side of the Alps"? And after all, the vineyards of the Rhine are not without beauty: to the traveller who is content to take them as he finds them, and not quarrel with them because they fall short of the picture of his fancy, they are objects of considerable interest. Indeed we are quite sure, that they cannot be very bad, when those who depreciate them find nothing worse than a Kentish hop-garden to compare them with. In the Winter-season indeed their appearance is not very attractive.

On this side of the Alps (says Mr. Russell,) a bare field is in Winter a more pleasing object that a vineyard. The vines either die, or are intentionally cut down nearly to the ground. If the poles which supported them are removed, as they generally are, the vineyard becomes a field of bare black stumps; if they are allowed to remain, it becomes a field of stiff straight poles, marshalled in regular array. Even in Summer and Autumn these vineyards add less to the beauty of a landscape than many other species of verdure. The vines, having reached in their growth the top of the stakes along which they are trained, curl downwards; they are ranged in parallel lines; the clusters avoid the eye, and lurk beneath the leaves. All the beauty that such a vineyard gives to the scene, consists merely in the mantle of deep verdure with which it clothes the soft and sunny slopes of the hills,—a merit not at all of rare occurrence, even in countries where the grape never ripened. When near the vineyard, it is in itself inferior to a hop-plantation, which is the very same thing in kind, with more body and stateliness; in the distance it is no greater ornament than a field of prosperous turnips would be; but our northern imaginations, warming at the idea of the vine, just as our blood glows with its juice, bestow on every garden of Bacchus the beauties of Eden.

From Basle to Mentz the course of the Rhine lies through an extended plain, which being chiefly alluvial, presents few favourable soils and exposures; but between the latter city and Coblentz it is confined within steep banks, which abound in strata propitious to the grape, and which rising occasionally into lofty hills, especially towards the northern side, afford the fairest aspects for its cultivation. On both sides of the river, accordingly, we behold extensive ranges of vineyards, yielding a profusion of excellent wines, supporting a numerous population, and giving an air of richness and animation to the scenery, which forms an agreeable contrast to the ruins of feudal magnificence that crown the principal heights. The choicest vintages, however, are limited to a portion of this district, called the Rheingau, extending on the right bank of the river, from Wallauf, a little below Mentz, to Rüdesheim, and including a space of rather more than nine English miles in length by about four in breadth; but the produce of some of the vineyards above Mentz, particularly of those at Hockheim, on the banks of the Mayn, is usually classed with the best Rhine wines, being of nearly equal excellence.

Cowardice of mind is the never-failing concomitant of a guilty conscience.—Blair.

A friend is worth all hazards we can run,
Poor is the friendless master of a world;
A world in purchase for a friend is gain.—Young.

An Eastern Saying.—He who violates his word is the first person that is injured by so doing.

THE HOUSE I LIVE IN.

No. II.

Material of the Frame.

We have already seen that the frame-work of the House I live in consists chiefly of bone. Before we go any further, I ought to tell you how bones are constructed, and of what substances they are formed.

structure of bone.

Timber is evidently full of little holes. If you take a piece of wood, of several sorts that might be mentioned, and placing your mouth at one extremity, blow hard, you can force a portion of air through it from end to end. This shows that there are little holes, or tubes, running through the entire piece. If you could blow hard enough, you might force air through any kind of wood. The experimental philosopher, by the assistance of adequate machinery, will force water and quicksilver through the pores of almost every sort of wood.

But you cannot blow through any of the pieces forming the frame-work of the House I live in. This shows that the internal structure of bone, though in appearance similar, is yet very different from that of wood.

shape of bones.

Bones are of three kinds; *long* bones; *broad* or *flat* bones; and *round* bones. The long bones have a cylindrical channel nearly throughout their entire length, which contains marrow, or pith; but the other two sorts of bones have no such cavity within them. They have, however, a great many little holes or cells in the inside. Some of them look, upon being broken, almost like sponge or honeycomb. Some of the long bones, besides being hollow, are also spongy. They are generally much larger at each extremity, and the spongy, or cell-like appearance, is there much more apparent. Towards, and at the middle part, they are smaller, firmer, and contain fewer of these little cells.

All the bones in the body are very hard on the outside. Perhaps the teeth are the most so. The inside of the teeth is not much harder than other bones; but the outside is coated with a substance called *enamel*, which is very hard indeed.

particular description of the bones.

You have already been told that the long, round bones, such as the *humerus*, or bone of the arm, and the *femur*, or bone of the thigh, are hollow, and contain marrow in their cavities. This marrow nearly, or altogether, fills up the hollow spaces*. These hollow spaces are lined by an extremely thin and delicate membrane, which also runs in among the marrow. The same sort of fine membrane also lines the cells contained in the spongy bones. These cells have a small quantity of liquid in them, and none of them appear to be entirely empty.

Most of the bones are pierced through their outsides, with one or more holes of considerable size, through each of which is carried an artery to convey blood to nourish the bones, and a vein comes out by the same aperture to bring back the blood when it has fulfilled its office. You may wonder that I should talk about blood in the bones. But there *is* blood in them, though not a great deal. This blood, with its vessels, the nerves, and the membranous linings, together with the marrow, and liquid matters, amount to many pounds in weight: for after the bones of

* This is true of the bones of most other animals besides man The bones of many birds, however are entirely hollow, and contain air, to assist them in flight.

any animal have been thoroughly dried, and all moisture extracted from them, they become diminished to almost half the weight they originally were. The entire bones of the human body, when perfectly dry, weigh from eight to twelve pounds.

GROWTH OF BONE.

WE are not born with the bones as hard as they become after we begin to walk and to run about. At first, many of them are very soft; and a large number of them are in several pieces, with cartilage, or gristle, between them. After a few years they grow firmly together. The bones of the head, in particular, are at first separate; and, without doing any injury to the soft and delicate structure of the brain contained within them, admit of some little motion, overlapping each other, as it were. But after we become older, and the whole skull has acquired firmness and solidity, it would require a very considerable force to remove them from each other, and the consequences of so doing, if we were enabled to effect it, would be highly dangerous.

There is, undoubtedly, *life*, as it is often called, in bones. While we continue in good health, and the functions of the body are duly performed, there is not much feeling in them; though in some cases of disease, they are endued with exquisite sensibility. When the surgeon amputates a limb, the proceeding of sawing through the bone is the least painful part of the operation, though people in general are apt to imagine that it is highly so.

VESSELS IN BONES.

THERE are also many minute blood-vessels and nerves running about in every direction through very small channels in the interior of the bones. That blood is certainly conveyed through and into bones, can be made very evident, by forcing, by means of a suitable apparatus, compositions made of liquid wax, and other substances, and coloured, to represent blood.

Another method is also used to show that blood circulates through bones. If a rabbit, or other small animal, be fed upon madder-root, in a short time the bones will be found to be tinged with the colouring principle of the madder.

THE HIP-BONES

ARE two large, irregular bones, placed at the top of what I have called the pillars of the House. These two large bones are very firm and strong.

These bones are called in books the *ossa innominata*. *Os* is a Latin word for bone; and *ossa* is its plural, meaning more bones than one. *Innominatum*, of which *innominata* is plural, means *without a name*, or nameless; and the word *innominata* makes a tolerable name, though rather long.

STRUCTURE.

THE ossa innominata are very firm and strong in grown persons; but in a child they are less so, and are in three pieces, each of which has a different name. They are joined together in front by a firm gristle, or cartilage. Behind, however, is a strong wedge-like bone, placed between them. Between this last bone, called the *sacrum*, and each of the ossa innominata, there is also a very strong gristle; but it is not so thick or strong as the one I have just mentioned as situated in the front. The ossa innominata and sacrum together make a kind of cup, or deep bowl—open at the bottom, it is true, but still bowl-like in its shape. This bowl is called the *pelvis*.

HIP-JOINT.

THE manner of fastening the thigh-bone, or femur, to the hollow of the innominatum, is very remarkable. The hollow where it is fastened, is shaped liked the inside of an egg-shell, with the small end broken off, and has received the name of *acetabulum*, from its supposed resemblance to the cup with which the ancients measured vinegar. The round end of the femur is fastened into this deep cavity, by a very large and strong cord. The shoulder is often dislocated, or detached from its situation; but this hollow is so deep, and the cord so strong, that nothing but very great violence will break the cord, or slip the femur out of its place.

These two great bones are united by a very strong cartilage. While we are young, and even after we are older, if we have lived temperately, this cartilage, which is very thick, will stretch or yield much more than you would at first suppose possible. It is of very great importance to preserve the soft and yielding nature of these cartilages as long as possible. To this end, you must, while young, take cheerful exercise, though not with violence; you must labour moderately every day, as you grow older; you must rise with the lark, and go to bed early; you must breathe pure air; your drink must be water, and your food of the plainest and purest kinds, not in excessive quantity, and must be well chewed. Then, you may hope to preserve your bones and cartilages in a good and healthy state till old age.

THE SPINE.

THE principal post—the main pillar of the building—the spine, runs through both stories, and is of singular construction. We usually call it the *back-bone*. Here is a representation of it—

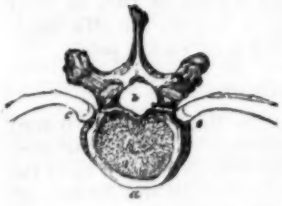
The spine is composed of no less than twenty-four separate pieces, each of which is called a *vertebra*. The plural of vertebra is *vertebræ*. The seven lower vertebræ are very large and strong. These parts of the frame are the principal supporters of the first or lower story. The twelve next above them, belonging to the second story, are somewhat smaller, and the seven which form the communication from the upper story to the cupola, or the bones of the neck, are yet smaller still. Their size in general decreases—not suddenly, but gradually—from the lowest to the highest.

The spine, or back-bone, is not only curious in its shape and structure, but is of the utmost importance in the human frame. If we had no spine, the limbs, beautifully adapted as they are for their intended purposes, could not act; they would fall powerless at each attempt to move them. It has been said, that "if one member," in any part of the body, "suffer, all the members suffer with it." This is especially true with regard to the spine.

EACH VERTEBRA.

EACH vertebra has a hole of considerable size throughout its middle (see *b* in the engraving). What is there shown, is the upper surface of one of the vertebræ, detached from its neighbours, and standing, as it were, by itself, for greater facility of description.

When the twenty-four vertebræ are placed, one above another, in the position which they occupy in the



living body, they contain a hollow channel throughout their entire length. This hollow is filled with a soft substance, very much resembling the marrow of other bones, but much more important in its offices. It seems like an arm or branch of the brain; for there is an open passage from the bottom of the *cranium*, or skull, into the hollow of the spine.

There is a very curious mechanical contrivance for admitting the head to turn from side to side, without pressing on the spinal marrow, and consequently injuring its functions. This is effected by the top vertebra of all, and which is called the *atlas*, moving upon and around an upward projection of the second vertebra, somewhat like a tooth in shape, though of a much larger size, and situated in the front aspect of the bone, and confined in its exact situation by a transverse ligament. By this means lateral motion is given to the head, without the necessity of moving the main trunk of the spine, but simply by the aid of the first joint formed by the first and second vertebra.

GENERAL DESCRIPTION.

When the vertebræ are put together in their proper position, there are large notches at the sides between each two bones, so exactly matched together as to form a hole. Thus there are as many holes in each side of the spine as there are vertebræ. Through these holes large branches of the marrow of the spine pass off, like the branches of a tree, to all parts of the body. These branches are called nerves. At first, they are pretty large; but they divide and subdivide, as they proceed towards the extremities of the frame, till they become very small. Their number, in all the soft parts of the body, particularly in the skin, is very great.

Those two upward projections in the cut, which look like arms, by strongly interlocking with the bones above and below them, serve as braces to the whole spine. At the sides are drawn parts of the ribs (*c e*) in outline. These show where the spine and ribs come together. That projection which in the engraving extends perpendicularly upwards is called the *spinous* process of the vertebra; this forms no part of the joint, but serves for the attachment of the large muscles which move the back and head.

Between these bones, where the body of each (*a*) rests upon the other, is a tough substance, or gristle, very yielding, or elastic, almost like India rubber. This keeps the bones from wearing out too fast when they move, and yet allows of their moving pretty freely.

The spine is, really, one of the most curious things in nature. The gristle, or cartilage, between the vertebræ is very thick and strong, but at the same time yielding; and it is so constructed and placed, as will best allow the spine to bend in various ways. It is so elastic or springy, and also so readily compressed, that people who stand or walk much, are really a little shorter at night than they are in the morning. Rest gives the elastic cartilages time and opportunity to spring back again into their places while we sleep, so that by the next morning we are as tall as ever.

I ought, however, to say—for it is a fact—that old people settle down a little, and are not so tall as in middle age, which is partly owing to these cartilages yielding and yielding till they become at length somewhat thinner.

If the soft marrow of the spine (which runs down from the brain) should happen to be bruised or injured, there would be an end of all motion, at least of the lower limbs. If the spine gets broken, it cannot be mended, and the sufferer will never entirely recover. How happy, then, that it is so admirably contrived, and so firmly put together, as rarely to be broken or dislocated!

THE RIBS.

The ribs may be compared to the girders of a building; though they look more like the hoops of a cask than like girders. There are twelve of them on each side. Each of them is connected, by one of its ends, to the large post, or spine; and, by the other, to a short post—the breast-bone. Only seven, however, are joined closely to the breast-bone itself. This junction is effected by means of cartilages, to allow of greater freedom of motion in the chest, so essential to full respiration and vigorous circulation of the blood. These *cartilages* are shown in the plate by fainter lines than those which represent the bony portions of the ribs. The other five go only a part of the way across, and then unite with the cartilages of the upper seven. Those ribs which are continued round from the spine, and *join* with the breast-bone, are called *true* ribs; the others, which do not form this attachment, are called *false* ribs.

The length of the ribs increases from the first or upper one, till you come to the seventh, which is the longest. From the seventh to the twelfth they grow shorter again, and the cartilages, of course, become longer in the same proportion. The twelfth rib is very short.

The number of ribs is almost always twelve; but sometimes there are only eleven, and at others, thirteen. But instances of more or less than twelve hardly occur in one person in a thousand.

In the old by-gone days of ignorance and superstition, a notion prevailed, which is not yet wholly extinct, that the *man* has one rib less on one side than on the other. It was said that as Eve was formed of a rib taken from Adam's side, he and all his male posterity have one rib the less for it. I hardly need say that this notion is wholly unfounded.

BREAST-BONE.

The name of this, in books, is *sternum*. It is usually considered as only *one* bone; but, like many others of the human frame, in infancy and in youth it consists of several pieces (three in number), closely united by gristle, or cartilage; but in advanced life, the whole usually becomes one solid bone.

THE COLLAR-BONE.

This forms a kind of brace between the shoulder and the breast-bone, and so nearly resembles a rib, that a separate cut, to show its shape and position, seems unnecessary. You will see it in engravings of the skeleton, running across from the shoulder to the breast-bone, or sternum.

THE SHOULDER-BLADE

Is a broad, flat bone, with ridges on it for the attachment of muscles; and at the fore-part is the hollow, or socket, in which the round head or ball of the *humerus*, or arm-bone, lies and moves. Here is a back view of it. This bone is called by anatomists the *scapula*.

ON SOUND.

ONE of the most important uses of the atmosphere is the conveyance of sound. Without the air, death-like silence would prevail through nature; for, in common with all substances, it has a tendency to impart vibrations to bodies in contact with it. Therefore, undulations received by the air, whether it be from a sudden impulse, such as an explosion, or the vibrations of a musical chord, are propagated in every direction, and produce the sensation of sound upon the auditory nerves. A bell rung under the exhausted receiver of an air-pump, is inaudible; which shows that the atmosphere is really the medium of sound. In the small undulations of deep water in a calm, the vibrations of the liquid particles are made in the vertical plane, that is, up and down, or at right angles to the direction of the transmission of the waves. But the vibrations of the particles of air which produce sound, differ from these, being performed in the same direction in which the waves of sound travel. The propagation of sound may be illustrated by a field of corn agitated by a gust of wind. However irregular the motion of the corn may seem on a superficial view, it will be found, if the intensity of the wind be constant, that the waves are all precisely similar and equal, and that all are separated by equal intervals, and move in equal times.

A sudden blast depresses each ear equally and successively, in the direction of the wind; but in consequence of the elasticity of the stalks, and the force of the impulse, each ear not only rises again as soon as the pressure is removed, but bends back nearly as much in the contrary direction, and then continues to oscillate backwards and forwards in equal times, like a pendulum, to a less and less extent, till the resistance of the air puts a stop to the motion. These vibrations are the same for every individual ear of corn. Yet as their oscillations do not all commence at the same time, but successively, the ears will have a variety of positions at any one instant. Some of the advancing ears will meet others in their returning vibrations, and as the times of oscillations are equal for all, they will be crowded together at equal intervals. Between these, there will occur equal spaces, where the ears will be few, in consequence of being bent in opposite directions; and at other equal intervals they will be in their natural upright positions. So that over the whole field there will be a regular series of condensations and rarefactions among the ears of corn, separated by equal intervals, where they will be in their natural state of density. In consequence of these changes, the field will be marked by an alternation of bright and dark bands. Thus the successive waves which fly over the corn with the speed of the wind, are totally distinct from, and entirely independent of, the extent of the oscillations of each individual ear, though both take place in the same direction.

The length of a wave is equal to the space between two ears precisely in the same state of motion, or which are moving similarly, and the time of the vibration of each ear is equal to that which elapses between the arrival of two successive waves at the same point. The only difference between the undulations of a corn-field, and those of the air which produce sound, is, that each ear of corn is set in motion by an external cause, and is uninfluenced by the motion of the rest; whereas, in air, which is a combustible and elastic fluid, when one particle begins to oscillate, it communicates its vibrations to the surrounding particles, which transmit them to those adjacent, and so on continually. Hence, from the successive vibrations of the particles of air, the same regular condensations and rarefactions take place as in a field of corn, producing waves throughout the whole mass of air, though each molecule, like each individual ear of corn, never moves far from its state of rest.

The small waves of a liquid, and the undulations of the air, like waves in the corn, are evidently not real masses moving in the direction in which they are advancing, but merely outlines, motions, or forms, rushing along, and comprehending all the particles of an undulating fluid, which are at once in a vibratory state. It is thus that an impulse given to any one point of the atmosphere is successively propagated in all directions, in waves diverging from the centre of a sphere to greater and greater distances, but with decreasing intensity, in consequence of the increasing number of particles of inert matter which the force has to move, like the waves formed in still water by a fallen stone, which are propagated circularly all around the centre of disturbance. The successive spherical waves are only the repercussions of the condensations and motions of the first particles to which the impulse was given.

[MRS. SOMERVILLE'S *Connexion of the Sciences.*]

FLOWERS.—"Solomon in all his glory was not arrayed like one of these;" and Solomon in all his wisdom never taught more wholesome lessons than these silent monitors convey to a thoughtful mind and an "understanding heart."—"There are two books," says Sir Thomas Browne, "from whence I collect my divinity; besides that written one of God, another of his servant Nature, that universal and public manuscript that expansed unto the eyes of all. Those that never saw him in the one have discovered him in the other." This was the Scripture and Theology of the Heathens; the natural motion of the sun made them more admire him than its supernatural station did the children of Israel; the ordinary effects of nature wrought more admiration in them than all his miracles. Surely the heathens knew better how to join and read these mystic letters than we Christians, who cast a more careless eye on these common hieroglyphics, and disdain to suck divinity from the flowers of nature.—*The Doctor.*

CHARITY IN DEPORTMENT.—He who shows hatred against the sinner, instead of exercising it only against the sin, condemns himself.—ST. EPHRAIM—*Book of the Fathers.*

EASY LESSONS ON CHRISTIAN EVIDENCES.

V.

Miracles. Part I.

The people who lived in the times of the Apostles, though they had not seen so much as we have of the fulfilment of the ancient prophecies, yet had seen them so far fulfilled in Jesus, as to afford good reasons for receiving Him.

But you may, perhaps, be inclined to wonder how they should need to search the Old Testament Scriptures for a confirmation of what the Apostles taught, if those Apostles performed such miracles as we read of. It may seem strange to you, that men who healed the sick with a touch, and displayed so many other signs, far beyond human power, should not have been at once believed, when they called themselves God's messengers. But you must remember how much the people of those days were accustomed to believe in magic. Indeed, in much later times, long after Christianity prevailed, it was a very common notion that there were magicians who were able, through the help of evil demons, to work various miracles. And in the days of the Apostles this belief in the power of magic was very general, both among the Jews and the Heathen. Those Jews among whom Jesus lived, and who rejected him, maintained that he was a magician, who did mighty works through the prince of demons. This is not only related by the Christian writers in the New Testament, but is a common tradition among the unbelieving Jews at this very day; who have among them an ancient book, giving this account of the origin of Christianity. And there can be no doubt that this must have been (as our sacred writers tell us it was) what the adversaries of Jesus maintained from the first. For if those who lived on the spot in his time, had denied or doubted the facts of the miracles, and had declared that the accounts of them were false tales, and that no miracles had ever really been wrought, we may be sure that the same would have been said ever after by their descendants. It is very unlikely that another generation of Jews should have betaken themselves to the pretence of magic, to account for miracles which had never been acknowledged at the time, but had been reckoned impostures by the very people among whom they were said to have been performed.

The pagan adversaries of Christianity also seem to have had the same persuasion on this subject as the Jews, and to have attributed the Christian miracles to magical art. We learn this from all the remains that have come down to us of the ancient writings against Christianity, and of the answers to them written by Christians.

Now suppose that in the present day any one should appear professing to be sent from God, and to work miracles as a sign of his being so sent, you would naturally think that the only question would be as to the reality of the miracles; and that all men would at once believe him, as soon as ever they were satisfied that he had performed something clearly beyond human power. But men certainly did not judge so in ancient times. It was not, then, only one question, but two that had to be settled; first, whether any sign had really been displayed which showed a power beyond that of man; and secondly, whether this supernatural power came from God or from an evil demon.

Now, after the former of these questions was decided, that is, after the fact of the miracles was admitted, the Jews were inclined still to doubt or disbelieve the religion which Jesus taught, because it was so different from what they had been used to expect; and hence it was, that the greater part of them attributed his miracles to magic. But others were of a more candid mind, ("more noble," as it is in our translations,) such as the people of Berœa. These, by carefully searching the Scriptures, satisfied themselves that the ancient prophecies respecting the Christ, did really agree with all that Jesus had done and suffered. And this it was that convinced them that his miracles were wrought not by evil spirits, but by the divine power; and thus they were brought to the conclusion that the kingdom of heaven was at hand.

If, then, any one should say to you, "How great an advantage the people who lived in those days, and saw miracles performed before their eyes, must have over us, who only read of them in ancient books and how can men in these days be expected to believe as firmly as *they* did?"—you may answer that different men's trials and advantages are pretty nearly balanced. The people who lived in those times were not (any more than ourselves) forced into belief whether they would or no; but were left to exercise candour in judging fairly from the evidence before them. Those of them who were resolved to yield to their prejudices against Jesus, and to reject Him, found a ready excuse (an excuse which would not be listened to now), by attributing his miracles to the magical arts which in those days were commonly believed in. And again, though they saw many miracles which we only read of, they did not see that great miracle (as it may be called) which is before our eyes, in the fulfilment of prophecy since their time. They could see, indeed, many prophecies fulfilled in Jesus; but we have an advantage over them in witnessing the more complete fulfilment of the prophecies respecting the wonderful spread of his religion.

Part II.

But can we of these days really find sufficient proof? some one may say, and such proof as is within the reach of ordinary Christians, for believing that miracles really were performed, which we never saw, but which are recorded in books, as having happened nearly 1800 years ago? Is it not expecting a great deal of us, to require us to believe that there were persons who used to cure blindness, and other diseases, by a touch or a word, and raise the dead, and still the raging of the sea, and feed a multitude with a few loaves?

Certainly these things are in themselves hard to be believed; and if we were to find in some ancient book accounts of some great wonders which led to no effects that exist at this day, and had nothing to do with the present state of things among us, we might well be excused for doubting or disbelieving such accounts; or, at least, none but learned men who had the ability and the opportunity to make full inquiry into the evidence for such a book, could fairly be expected to trouble themselves about the question. But the case of the Christian miracles is not one of this kind. They are closely connected with something which we see before us at this day; namely, with the existence of the Christian religion in so great a part of the world. A man cannot, indeed, be fairly required to believe anything very strange and unlikely, except when there is something still more strange and unlikely on the opposite side. Now, that is just the case with respect to the Christian miracles; for, wonderful as the whole Gospel History is, the most wonderful thing of all is, that a Jewish peasant should have succeeded in changing the religion of the

world. That He should have succeeded in doing this without displaying any miracles, would have been more wonderful than all the miracles that are recorded; and that He should have accomplished all this by means of *pretended* miracles, when none were really performed, would be the most incredible of all. So that those who are unwilling to believe anything that is strange, cannot escape doing so by disbelieving the Gospel, but will have to believe something still more strange, if they reject the Gospel.

And it is the same in many other cases, as well as in what relates to religion. We are often obliged to believe, at any rate, in something that is very wonderful, in order to avoid believing something else that is still more wonderful. For instance, it is well known that in these islands, and in several other parts of the world, there are great beds of sea-shells found near the tops of hills, sometimes several thousand feet above the sea. Now it is certainly very hard to believe that the sea should ever have covered those places which now lie so far above it. And yet we are compelled to believe this, because we cannot think of any other way that is not far more incredible, by which those shells have been deposited there.

And so it is with the Gospel history. We are sure that the Christian religon does now exist, and has overspread most of the civilized world; and we know that it was not first introduced and propagated (like that of Mohammed) by force of arms. To believe that it was received, and made its way, without miracles, would be to believe something more miraculous (if one may so speak) than all the miracles that our books record.

But some people may say that the ancient Jews and Pagans, who so readily believed in magical arts, and the power of demons, must have been very weak and credulous men; and that therefore they may have given credit to tales of miracles without making any careful inquiry. Now there is, indeed, no doubt that they were weak and credulous; but this weakness and credulity would never have led them to believe what was against their early prejudices, and expectations, and wishes: quite the contrary. The more weak and credulous any man is, the harder it is to convince him of anything that is opposite to his habits of thought and inclinations. He will readily receive without proof anything that falls in with his prejudices; and will be disposed to hold out against any evidence that goes against them.

Now all the prejudices of the Jews and Pagans were against the religion that Jesus and his Apostles taught; and, accordingly, we might have expected that the most credulous of them should have done just what our histories tell us they did; that is, resolve to reject the religion at any rate, and readily satisfy themselves with some weak and absurd way of accounting for the miracles. But, credulous as they were about magic, the enemies of Jesus would never have resorted to that pretence, if they could have denied the facts. They would certainly have been more ready to maintain, if possible, that no miracles had taken place, than to explain them as performed by magic; because this pretence only went to make out that Jesus, notwithstanding his miracles, *might possibly* not come from God; whereas, if they could have shown that He or his Apostles had attempted to deceive people by pretended miracles, this would at once have held them up to scorn as impostors.

We read in the Gospel of St. John (chap. ix.), that the Jewish rulers narrowly examined into the reality of a miracle performed by Jesus, on a man that was born blind. This is exactly what we may be sure must have been done in the case of other miracles also; and if the enemies of Jesus could have succeeded in detecting and exposing any falsehood or trick, they would have been eager to do so, because they would be thus sure to overthrow his pretensions at once.

It is plain, therefore, that the weakness and credulity of the people of those days would be very far from disposing them readily to give credit to miracles, in favour of a religion that was opposed to their prejudices; and that, on the contrary, such persons would be likely, some of them obstinately to reject the religion, and others, only gradually and slowly to receive it, after having carefully searched the ancient prophecies, and found that these went to confirm it. Now this is just the account that our histories give.

It appears certain, then, that the unbelieving Jews and Pagans of those days did find it impossible to throw any doubt on the fact of the miracles having really been performed; because that would have enabled them easily to expose Jesus to contempt as an impostor. Their acknowledging the miracles, and attributing them to magic, as the unbelieving Jews do to this day, shows that the evidence for them, after the strictest scrutiny by the most bitter enemies, was perfectly undeniable, at the time and place when they were said to be performed.

QUEEN VICTORIA.

OH Sovereign Lady of our land, and lady of our love,
Auspicious dawns thy youthful reign, auspicious may it prove,
There never shone a brighter crown upon a fairer brow,
Hail! youthful Queen Victoria, a peerless Queen art thou!

The sceptre borne by thy fair hand three gallant realms obey,
And proud is each of all those realms to own its gentle sway;
With heart and voice they greet thee, they greet thee with their smiles, [isles!
Queen of Britain's mighty empire,—Queen of ocean's fairest

Old England boasts her roses, and her fairest rose art thou,
Green Erin hails with rapt'rous shouts her shamrock on thy brow;
In Scotia's blue bonnets is the hardy thistle seen,
All waving for Victoria, their young, beloved Queen.

A prouder sov'reignty is thine than the Roman ever knew,
Thy sceptre rules, thy banner waves, where his eagle never flew; [down,
And throughout thy wide dominions, where never sun goes
Religion, peace, and freedom, as jewels deck thy crown.

In darkness in the silent tomb is a mighty monarch laid,
And his sceptre and his crown descend on thee, a gentle maid;
In native majesty thou stand'st, with firm right-royal mien,
Whilst loyal nobles kneeling, vow allegiance to their Queen.

Through thy fathers' halls and palaces, the heralds' trumpets sound, [drowned;
But e'en the brazen trumpet's voice in thy people's shout is
All behold thy deep emotion,—the tears that thou dost shed,
Whene'er thy people's prayers invoke heav'n's blessings on thy head.

Those tears will bring forth blessed fruit, they are not shed in vain, [drinks in the rain;
Our hearts and minds have drunk them in, as the earth
Full well amidst a loyal race dost thou act the monarch's part,
And loyally will we obey the wishes of thy heart.

To guard Britannia's youthful queen we need no warrior bands,
In a faithful people's heart she lives, protected by their hands;
The glories we remember well of the days of great Queen Bess, [may bless.
And pray that glories brighter far, Queen Victoria's reign

LONDON:
JOHN WILLIAM PARKER, WEST STRAND.
PUBLISHED IN WEEKLY NUMBERS, PRICE ONE PENNY, AND IN MONTHLY PARTS, PRICE SIXPENCE.
Sold by all Booksellers and Newsvenders in the Kingdom.